

ABSTRACT OF THE DISCLOSURE

An optical cross-connect apparatus that realizes highly efficient optical cross-connection by performing large-scale switching. This optical cross-connect apparatus comprises first wavelength converters for converting m different wavelengths λ_1 through λ_m contained in n WDM input optical signals into $2m$ wavelengths λ_1 through λ_{2m} ; a first wavelength cross-connector for performing cross-connection according to wavelengths, including demultiplexers for separating the optical signals wavelength-converted by the first wavelength converters into $2m$ wavelengths and multiplexers for combining optical signals with the $2m$ separated wavelengths, wherein the same wavelengths should not be sent via each of bundles of $2m/n$ lines by which the demultiplexers and the multiplexers are connected; second wavelength converters for converting the $2m$ wavelengths contained in the optical signals cross-connected by the first wavelength cross-connector into $2m$ wavelengths; a second wavelength cross-connector for performing cross-connection according to wavelengths, including demultiplexers for separating the optical signals wavelength-converted by the second wavelength converters into $2m$ wavelengths and multiplexers for combining optical signals with the $2m$ separated wavelengths, wherein the same wavelengths should not be sent via each of bundles of

2m/n lines by which the demultiplexers and the multiplexers are connected; and third wavelength converters for converting the 2m wavelengths λ_1 through λ_{2m} contained in the optical signals cross-connected by
5 the second wavelength cross-connector into m wavelengths λ_1 through λ_m and for sending the m wavelengths λ_1 through λ_m .